

What is claimed is:

1.

A substantially pure adduct of an estrogen and a purine selected from the group consisting of guanine or adenine.

2.

An adduct according to claim 1 wherein the estrogen is estrone.

3.

An adduct according to claim 1 wherein the estrogen is  $17\beta$ -estradiol.

4.

An adduct according to claim 1 wherein the adduct is selected from the group consisting of 7[4-hydroxyestron-1( $\alpha,\beta$ )-yl]guanine, 7[4-hydroxyestradiol-1( $\alpha,\beta$ )-yl]guanine,  $N^2$ [2-hydroxyestron-6-yl]deoxyguanosine,  $N^2$ [2-hydroxyestradiol-6-yl]deoxyguanosine,  $N^6$ [2-hydroxyestron-6-yl]deoxyadenosine, and  $N^6$ [2-hydroxyestradiol-6-yl]deoxyadenosine.

5.

An adduct according to claim 1 wherein the adduct is 7[4-hydroxyestron-1( $\alpha,\beta$ )-yl]guanine.

6.

An adduct according to claim 1 wherein the adduct is 7[4-hydroxyestradiol-1( $\alpha,\beta$ )-yl]guanine.

7.

A substantially pure adduct of estrone-3,4-quinone and guanine.

8.

A substantially pure adduct of estrone-2,3-quinone and a purine nucleoside selected from the

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30.

A method according to claim 29 wherein the fluorescent probe is dansyl chloride.

31.

A method according to claim 29 wherein the reaction step takes place in acetone under basic conditions.

32.

A method of concentrating and purifying estrogen-nucleoside and estrogen-mercapturate adducts isolated from biological sources comprising:

covalently coupling anti-adduct antibodies to a solid matrix to form bound anti-adduct antibodies, wherein the matrix is derivatized with couplers selected from the group consisting of CNBr, N-hydroxysuccinimide, and hydrazide; and

detecting the bound anti-adduct antibodies with polyclonal antibodies wherein the polyclonal antibodies are specific for the anti-adduct antibodies.

2  
33.

A method according to claim 32 wherein the solid matrix is agarose gel.

3 34.

A method according to claim 33 wherein the agarose gel is in the form of beads and further providing that the beads are from about 50-200  $\mu$  in diameter.

4  
35.

A method according to claim 32 wherein the biological source is selected from the group consisting of human serum, tissues, tissue extracts, urine and other bodily fluids.

group consisting of deoxyguanosine or deoxyadenosine.

9.

A substantially pure adduct of a compound selected from the group consisting of N-acetyl cysteine, cysteine and; an estrogen.

10.

A substantially pure adduct according to claim 9 wherein the estrogen is selected from the group consisting of estrone and 17 $\beta$ -estradiol.

11.

A substantially pure adduct according to claim 9 wherein the adduct is selected from the group consisting of 4-hydroxyestron-1-yl-cysteine, 4-hydroxyestradiol-1-yl-cysteine, 4-hydroxyestron-1-yl-N-acetylcysteine, 4-hydroxyestradiol-1-yl-N-acetylcysteine, 2-hydroxyestron-1-yl-cysteine, 2-hydroxyestradiol-1-yl-cysteine, 2-hydroxyestron-1-yl-N-acetylcysteine, 2-hydroxyestradiol-1-yl-N-acetylcysteine, 2-hydroxyestron-4-yl-cysteine, 2-hydroxyestradiol-4-yl-cysteine, 2-hydroxyestron-4-yl-N-acetylcysteine, and 2-hydroxyestradiol-4-yl-N-acetylcysteine.

12.

A diagnostic method for detecting the presence of adducts selected from the group consisting of estrogen-guanine adducts and estrogen-mercapturate adducts in animals, comprising:  
obtaining a sample of body fluids; and  
assaying for the presence of a monoclonal antibody, wherein the monoclonal antibody specifically binds the adducts.

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13.

A diagnostic method according to claim 12 wherein the body fluid is selected from the group consisting of a blood sample and a urine sample.

14.

A diagnostic method according to claim 12 wherein the assaying step detects the monoclonal antibody using a method selected from the group consisting of spectrophotometrically, colorimetrically, and fluorometrically.

15.

A diagnostic method according to claim 12 wherein the adduct in the body fluid sample is captured with the monoclonal antibody and the immunodiagnostic reagent in a volume ratio of from about 1:1 to 1:300.

16.

An immunocapture test capable of detecting adducts selected from the group consisting of estrogen-guanine and estrogen-mercapturate adducts comprising:

a monoclonal antibody which captures a specific antigenic portion of an adduct selected from the group consisting of an estrogen-guanine or an estrogen-mercapturate adduct;

a labeled monoclonal antibody which detects the presence of the captured antigenic portion of the adduct;

a body fluid sample suspected of containing an adduct.

17.

An immunocapture test according to claim 16 wherein the body fluid is selected from the group consisting of a blood sample or a urine sample.

18.

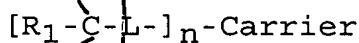
A method for detecting estrogen-induced cancer in humans comprising:  
obtaining a body fluid sample suspected of containing adducts selected from the group consisting of estrogen-guanine and estrogen-mercapturate adducts from a human; and assaying for the presence of the adducts in said sample with a monoclonal antibody which specifically binds the adducts.

19.

A method according to claim 18 wherein the adduct is selected from the group consisting of 7[4-hydroxyestron-1( $\alpha,\beta$ )-yl]guanine, 7[4-hydroxyestradiol-1( $\alpha,\beta$ )-yl]guanine, 4-hydroxyestron-2-yl-cysteine, 4-hydroxyestradiol-2-yl-cysteine, 4-hydroxyestron-2-yl-N-acetylcysteine, 4-hydroxyestradiol-1-yl-N-acetylcysteine, 2-hydroxyestron-1-yl-cysteine, 2-hydroxyestradiol-1-yl-cysteine, 2-hydroxyestron-1-yl-N-acetylcysteine, 2-hydroxyestradiol-1-yl-N-acetylcysteine, 2-hydroxyestron-4-yl-cysteine, 2-hydroxyestradiol-4-yl-cysteine, 2-hydroxyestron-4-yl-N-acetylcysteine, and 2-hydroxyestradiol-4-yl-N-acetylcysteine.

20.

A synthetic antigen having the general formula:



wherein  $R_1-\overset{\curvearrowright}{C}$  is a hapten comprising an adduct selected from the group consisting of estrogen-guanine and estrogen-mercapturate and the estrogen

is selected from the group consisting of estrone and estradiol;

-L- is coupled to  $R_1$  at C-16 of the estrogen, and L represents a linking moiety which includes the residue of the reaction of a first linking agent reactive group with the C-16 group of R and is attached to the carrier by a connective group which is the residue of a second linking-agent reactive group with a reactive coupling group on the carrier;

the carrier is a macromolecule conferring antigenicity; and

n is an integer not exceeding the number of available reactive coupling groups on the carrier.

21.

A synthetic antigen according to claim 20 wherein L is a divalent residue derived from a compound selected from the group consisting of succinimidyl-4-(N-maleimidomethyl)cyclohexane-1-carboxylate, sulfosuccinimidyl-4-(N-maleimidomethyl)cyclohexane-1-carboxylate, N- $\tau$ -maleimidobutyryloxysuccinimide ester, N- $\tau$ -maleimidobutyryloxysulfosuccinimide ester and N-succiniuridyl-3(2-pyridyldithio)propionate.

22.

A synthetic antigen according to claim 21 wherein L is N-maleimidomethylcyclohexane-1-carboxylate.

23.

A synthetic antigen according to claim 20 wherein the carrier is a protein selected from the group consisting of mammalian serum albumins, keyhole limpet hemocyanin, mammalian immunoglobulins, thyroglobulin, ovalbumin and poly-1-lysine.

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24.

A monoclonal antibody which is specific to the antigen of claim 20.

25.

A polyclonal antibody which is specific to the antigen of claim 20.

26.

A monoclonal antibody according to claim 24 wherein the monoclonal is insolubilized by securing it to a solid matrix.

27.

A method for detecting the hapten of claim 20 in a biological sample comprising:

exposing the biological sample or an extract thereof suspected of containing the hapten, to an antibody which recognizes the hapten; and

detecting the presence of immunocomplexes formed between said antibody and said hapten.

28.

A method according to claim 27 wherein the antibody is a monoclonal antibody.

29.

A method of detecting estrogen-mercapturate adducts and estrogen-purine base adducts in a biological fluid sample comprising:

reacting the fluid sample with a fluorescent probe such that the fluorescent probe couples to the estrogen-mercapturate adducts and estrogen-purine base adducts in the fluid sample to form fluorescent adducts;

detecting the fluorescent adducts using high pressure liquid chromatography.